Integrated Test and Operation System (ITOS)

Summary

ITOS is a real-time control and monitoring system developed and maintained by a small team at the Goddard Space Flight Center. It is a portable, highly configurable system which runs under a variety of UNIX operating systems, including Solaris, FreeBSD, and Linux on workstation or PC hardware. ITOS was originally developed for control of spacecraft and spacecraft components during development, test, and on-orbit operations, but actually can be applied to most any control and monitoring process.

At A Glance

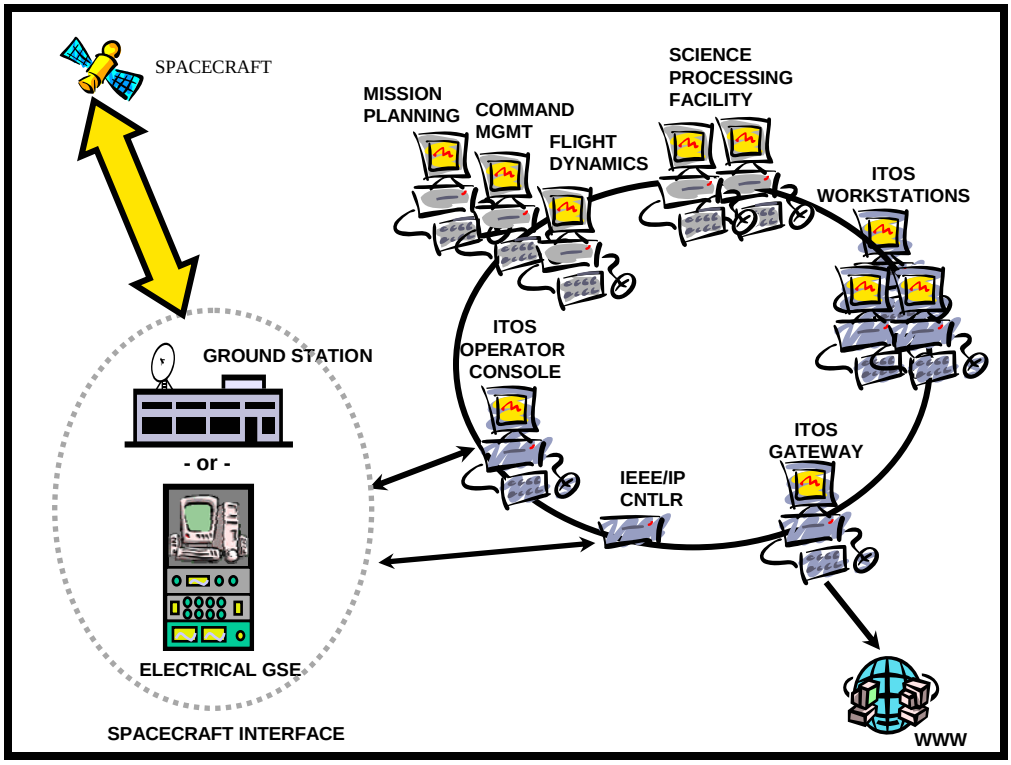
ITOS is a highly configurable low-cost control and monitoring system.

Features

- Makes extensive use of freely available software, operating systems, and technical support
- WWW interface for remote monitoring
- Provides infrastructure required for lights-out operations
- No custom front-end required

Benefits

- Extreme low cost
- Database driven - ITOS software need not be customized from mission to mission
- Migrates from development labs to operations



Current Applications

- Satellite development test and operations
- Science instrument development, test and operations
- Ground station equipment monitoring and control

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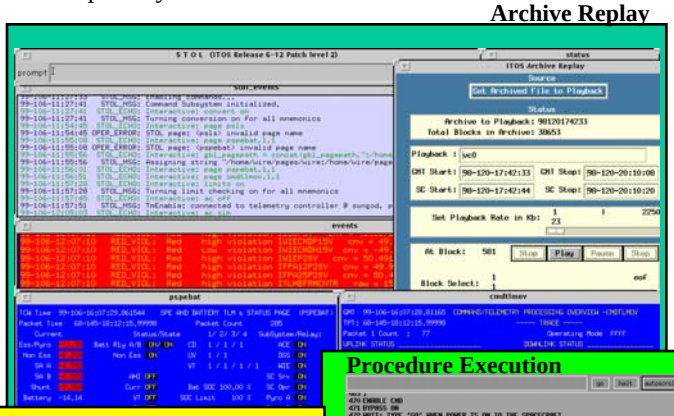
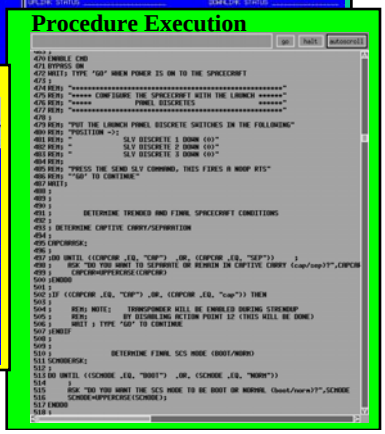
Features and Capabilities

- Ingests CCSDS telemetry transfer frame data and reassembles telemetry source packets.
- Database driven decommutation of telemetric data.
- Real-time data conversion and limit checking of telemetric data.
- Distributes telemetry data to users via TCP/IP network.
- Provides real-time & off-line data analysis tools:
  - Packet dumps, sequential prints, XY plotting, strip charts, playback.
- Archives processed data for long-term storage.
- STOL language:
  - S/C and ground system control.
  - Procedure control with logic and arithmetic capability.
  - TCP/IP, serial, and IEEE-488 external communication.
- Time-tagged event messages with audible alarm for critical events.
- Image load generator/editor.
- Remote display of real-time data and events via web browser using Java (can monitor S/C from home or office).
- Monitors states and initiates actions.
- Database driven spacecraft command formatting.
- CCSDS COP-1 S/C command and verification capability.
- Image load, dump, and compare.
- Real-time display of telemetry data with snapshot capability.
- Remote control of IEEE-488 and RS-232 instrumentation.
- C language and network-based interface to operational database.
- WWW access to real-time telemetry.
- Software based on X windows, Motif, and Java
- Efficient and portable.
- Runs on Unix PC or workstation.
- Integrated commercial plotting package.
- Makes use of Java programming language for portability, WWW remote monitoring and telemetry displays.
- Provides simple interfaces for integrating new technology or custom software.
- ITOS supports autonomy by providing in its scripting language:
  - Socket, file, and device I/O (including control of IEEE-488 devices).
  - Access to the operating system.
- Compatible with wide variety of ground stations and networks:
  - DSN, USN, TOTS, LEO-T, TSI, STDN, TDRSS, AFSCN, Inmarsat

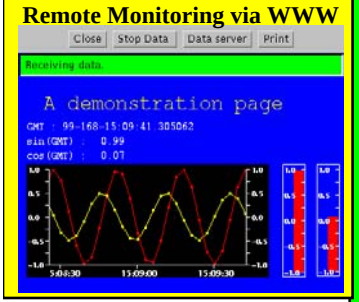
Archive Replay



Procedure Execution

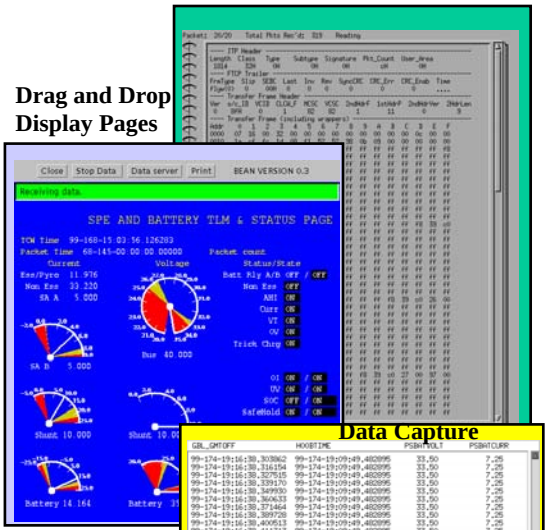


Remote Monitoring via WWW



Raw Frame Data Display

Drag and Drop Display Pages



Data Capture